The Maryland Fruit Grower

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A TIMELY DISCUSSION OF SOME RECENT ORCHARD PROBLEMS

A. F. Vierheller, Extension Horticulturist
College Park, Maryland

Now that the crop has been harvested, it may be well to consider a few of the things that have caused losses this season and are likely to be of further injury.

Possibly the first thing that comes into the mind of the average grower is the question of better control of apple scab. There seems little that is new, to add to the old conception of scab and its control. It is a cool weather disease thriving when moisture conditions are right for its development. Timely spraying with an efficient sulfur spray during the critical time of spread of this disease is about all the hope that we have. During the past season the critical time seemed to be during full bloom, though the period varied, in various parts of the State. Some growers feel that cultivation to turn under the fallen leaves, this fall, would be of help. However, due to the enormous spore production and the fact that the spores can travel great distances by air, it is doubtful if cultivation for this purpose alone will be practical or profitable.

Many growers will remember the droves of leaf hoppers that seemed at times to threaten to drive human beings out of the orchard, not to mention the damage that they did to the foliage of the trees. Unfortunately this damage came right at the time that good leaf functions were necessary to help in the production of good fruit color. Beside leaf injury, the brown stains that the hoppers leave on the fruit is a serious factor in dry seasons. The entomologists tell us that the leaf hopper is an insect whose development is hard to predict, as there may be several species of the leaf hopper present at one time. However, the white apple leaf hopper is the most important of the hoppers in the bearing orchard. This hopper lives over winter as eggs in the bark of the 3 to 5 year old apple wood. These eggs hatch between time of petal fall and second cover spray, becoming adults by mid-summer, and laying eggs for development of another generation by fall. The red spotted or striped species live over winter as adults under trash in the orchard or nearby woodland.

The adults of the red species become active in very early spring, and begin laying eggs in midrib, stem or larger veins of the leaves, as they develop. These eggs hatch and the whole families feed on the leaves, the young hoppers maturing by midsummer and eggs are laid for the next generation which reaches maturity in early fall. It is possible to control the hopper by use of nicotine, 1 pint, with 2 to 4 pounds of potash fish oil soap to each 100 gallons of spray mixture, and applied when the hoppers are young. Clean cultivation in the fall may or may not help in control of the hopper but proper pruning will aid in control, by allowing for better spray coverage. On the potato, Bordeaux spray has a marked repellant effect, and it is peculiar that

the same spray has so little effect in repelling the same insect on the apple leaf. The Maryland spray calendar suggests the use of nicotine in the First Cover Spray if leaf hoppers have appeared in great numbers. The use of nicotine in this spray is not made urgent, as it is impossible to predict whether or not the hoppers will become serious later.

Growers would do well to be on the look-out for red mite, as the trees are pruned this winter. There were some rather serious outbreaks of this insect, this summer, which did considerable damage to leaves and fruit by causing poor color, and early fruit dropping and also weakened buds for next year. Miscible oil spray applied in the spring will control this insect, but the entomologists warn us that the oil spray must not be applied too early or it will not give proper results, as the eggs have hard shells until near hatching time.

It sounds foolish to discuss San Jose scale, for that pest was controlled about 30 years ago. Unfortunately, it has crept back upon us, and the cull pile received many a scale-marked apple, this year, and lots of growers did not even attempt to pack for export, as scale was present in enough numbers to make an export pack expensive if not risky, or even impossible. The old control remedy still holds good. Concentrated lime-sulfur 12½ gallons per 100, and applied thoroughly will clean up the scale. Where the infestation is heavy, it is well to apply the spray as a dormant application, not waiting until delayed dormant. In this way it is possible to pick out the good days, and avoid windy weather, thus insuring good coverage. Miscible oil, 3% may also be used in scale control, but again, thorough coverage is essential.

Then we have those persistent pests, the field mouse and the pine mouse. Of these, the pine mouse is the most destructive, because of its deep burrows and resultant root injury, which is seldom noticed until damage has been heavy. Cultivation may or may not rout these pests from the orchard. About the best methods to use are to remove the trash from around the tree trunks for a foot or more; dig the ivy from under the trees where mice are known to burrow; but in any rase, whether anything else is done, use poison bait, dropping about a teaspoonful into a few of the burrows around trees where mire seem active. Some bait placed under small bundles of fodder scattered along the tree rows is also effective. Poison grain bait may be purchased in moisture-proof bags (25 lbs.) for $3.50 per bag f. o. b., Inwood, W. Va. Make check or money order payable to Inwood Fruit Growers' Association. The grain will come to you express collect. Look for mice now. There seems to be no closed season on mouse injury.

After last year's rabbit damage to young trees, there has been considerable feeling that such trees should be protected from rabbit injury during the coming winter. There have been several repellant mixtures developed, but none of them seemed to be entirely satisfactory. A formula recently perfected by the Michigan Experiment Station consists of 5 parts rosin and 1 part linseed oil, melted together and applied with a brush. It is easy to make and to use, and does not damage the trees. Wrapping the trees with several thickness of paper also protects the trees from injury.

Codling moth bands should be removed from the trees and burned as soon as this can be done, especially if the bands are untreated. As soon as food supplies become short, the birds will begin tearing the bands off the trees, to get at the worms under the bands. Considerable damage may be done even to treated bands if the birds are hungry enough and the bands contain many live worms.

Now let's look at the diseases of the peach which cause the grower most trouble and loss.

Is there anything new known about them, or are there any new suggestions offered in their control?

Regarding peach leaf curl, there are possibly a few new opinions and observations. Dr. A. J. Mix of Kansas, reported recently that the spores of this disease may live over more than one season, and cause infection. Also, infection may come later then formerly suspected, even coming when the leaves are well sized. There is also evidence that the spores do not live over on the buds along, but also on all surfaces of the dormannt tree.

Thorough spraying before the buds begin to swell, is the only reliable control for leaf curl. The pathologists strongly recommend fall spraying applying it in late November to early December. If praying for scale and leaf curl, use lime-sulfur 12½ gallons per 100; if for leaf curl only, 6½ gallons of lime sulfur per 100 gallons of spray mixture is sufficiently strong. Miscible oils may be used at 3% strength to control scale, and as a leaf curl control, 6-6-100 Bordeaux mixture may be added to the oil. If scale is not a factor, the 6-6-100 Bordeaux should give control. The use of 6 pounds of copper sulfate (bluestone) in 100 gallons of water has been recommended in control of leaf curl, but growers complained that it was a failure. According to the pathologists, the cause of failure may have been due to the washing off of the bluestone, after applying the spray. Merely adding 6 pounds of lime to the bluestone makes Bordeaux, and it is known to stick to the trees better. Some of the manufactured spray materials containing sulfur compounds have shown good results in curl control.

Brown rot is still with us, and it is still strongly advised that the rotted mumied fruits be knocked off the trees as the winter pruning is done. Next spring some early cultivations will help in keeping down the early infections of the disease. A new thought in brown rot control is to keep the curculio under control as far as possible, as the punctures made by these insects allow easy entry of the disease. Future treatment of brown rot will center more around mild sulfur sprays near ripening time, and the use of sulfur in the brusher or cleaner at packing time to prevent development of rot in transit.

Now for a summary and a few winter reminders: Trees should be scraped for codling moth control, and picking crates and baskets placed in a tight storage to kill out the moths as they emerge from these containers next spring. Remove and burn codling moth bands. Apply leaf curl spray. Plan to protect young trees from rabbits, and to control San Jose scale. Then, of course, there's pruning to get started and lastly, better look over the spray rig, and be sure it is cleaned and thoroughly drained.

COMING MEETINGS

Connecticut Pomological Society and American Pomological Society, Hartford, Connecticut, December 10-13. New England Fruit Show in connection with meetings.

New Jersey State Horticultural Society, Atlantic City, New Jersey, December 3-5.

Virginia State Horticultural Society, Roanoke, Virginia, December 10-12.

Peninsula Horticultural Society, Bridgeville, Delaware, December 18-20.

HOW DO YOU PRUNE YOUR PEACH TREES?

Dr. A. Lee Schrader, Research Pomologist
University of Maryland

What determines the *kind* of cuts you are going to make on your peach trees and how do you know *when to stop* cutting? Is the tree telling the fruit grower how to prune its branches? Is the fruit grower shaping the tree according to some blue-print plan that will mathematically place a certain number of peaches on a wooden structure built for economical design as to strength, shape, and ease of management? Or how is the trick accomplished? These questions are not answered simply by saying it is a matter of *good judgment* on the part of the pruner. The matter of *good judgment* must be analyzed in the light of experience and research work to give a more detailed picture which can be more readily visualized.

Experience is a good teacher, if you can interpret the many lessons which are being brought to your door. In peach pruning, a protfitable experience resulting from wise pruning may assist in future pruning, but an unprofitable experience from unwise pruning tells us little to correct the condition resulting from such pruning. In other words, the peach tree from year to year may present a new problem in pruning which cannot be solved by experience of previous prunings. For instance, one grower produced poorly colored peaches under a dense canopy of foliage. His type of pruning, "a table-top-shearing," had been fairly successful until he increased his nitrogen fertilizer application. With this pruning method, the response to additional nitrogen was a dense new top growth with heavy foliage that cut out all sunlight from the fruits on the tree. Measurement of such light conditions showed only 200 foot candles under the tree foliage compared with 8,200 foot candles in open sunlight. In addition to poor color of fruit, under such shade, the tarnished plant bug injury which causes knotty, ill-shaped fruits is most prevalent and difficult to prevent.

If such mistakes in pruning are made, what can we do to correct the errors?

The correction of bad conditions, due to pruning, lies largely in a knowledge of the responses of tree growth to the types of cuts which are made. The types of cuts include:

(Type 1) Entire removel of branches or twigs back to the point of origin where the bud started such growth. Such removal is called "thinning out" and results in *little stimulation* to the growth of the remaining branches. Watersprouts do not occur at the wounds except where large branches are removed.

(Type 2) The removal to a portion of a branch back to a lateral branch originating on two year wood or older. Such cuts markedly stimulate the growth of the remaining branches. This cut is termed "cutting back", and is a very desirable type of cut to make on bearing trees in combination with a lesser amount of "thinning out." Annual cutting back into two and three year wood will avoid the necessity for heavy renewal pruning in any one year.

(Type 3) The removal of a portion of the new wood, one-year-old, to a bud or lateral on such wood. The term, "heading back" is used for this cut. This type of cut is most often misused, especially on young trees. Bad results occur on older trees, as was the case, previously cited, when a dense canopy of foliage resulted in poorly colored peaches. On young trees, a very bad condition difficult to correct, results when severe "heading back" of new wood is done. The remaining buds on such trees push forth very vigorous upright

shoots, clustered together which necessitates severe thinning in later years and consequent dwarfing of the tree and loss of yielding capacity, especially in the early years of fruiting. These points have been discussed more fully in Maryland Station Bulletin 299. The ideal pruning of the young tree was shown to be a light "heading back" of new wood of main terminals and a light thinning to shape the scaffold, retaining inside twigs.

Corrective pruning of young trees too severely headed back proved fairly easy to accomplish with some 3 year old Brackett and Shippers Late this past season, even to the extent of increasing yield compared with a general heading of the upright new growth. The corrective pruning consisted of a light heading of main terminals and considerable thinning out of crowding branches to develop well-spaced scaffold branches. The yield results, as totals of 5 trees were as follows:

	Shippers Late	*Bracket*
Corrective Pruning	11.50 bus.	8.75 bus.
Check	7.50 bus.	8.25 bus.

A more spreading tree resulted from the corrective pruning and consequently the fruits were more highly colored. Subsequent seasons, of course, should show decided benefits in tree size, fruit color, and yields.

In correction of bearing trees with the dense growth of new wood over the top, the matter was not so simple. Two seasons of pruning 1934 and 1935, were necessary to make a decided change in the top response and increase fruit color. However, *no more heading of new wood* was done. Considerable thinning out of upright growths was accomplished the first season plus cutting back where possible to good lateral branches. Some slight improvement in openness of tree and fruit color was found in this first season. In the second season, with further thinning out and much fewer upright shoots to combat, the cutting back to lateral in two or three year wood resulted in an open spreading tree with fruits colored 30 to 50 per cent in contrast with 5 per cent or less on trees pruned by the former heading back to new wood. The yields on 15 year Elbertas were as follows:

		Average Yield Per Tree	*Per cent Color*
Corrective pruning	(8 trees)	4.53	30 to 50
Check	(8 trees)	3.19	0 to 5

These results in Maryland orchards serve to emphasize the importance of knowing tree response to pruning cuts, and to use the saw and shears with good judgment, *based on this knowledge.*

AN EXPLANATION

There is an old story of a judge who found an old darky guilty of stealing chickens. The judge said "Henry, I am sending you to jail for one year. Have you anything to say?" The old fellow replied, "No, suh. Exceptin' that you shorely is liberal with my time".

Possibly the fruit grower feels at times, that other folks are liberal with his money. This year, he sprayed, perhaps more than ever, yet scab was bad, or spray burn, or what not. Of course, nobody wants to urge any more sprays than necessary, and failures to control even with heavier sprays may be explained by time of application, weather condition, etc.

This year, possibly many growers will be disappointed at the few codling moth worms under the tree bands, and will wonder if the results were worth the cost. The entomologists have the answer to our doubts. First, remember that the carry-over of codling moth from last year was heavy. It looked favorable for a heavy emergence of moths last spring, but the cool weather upset the emergence, delayed egg laying and reduced the number of eggs that the moths laid. With this delayed egg laying and hatching, it looked like the grower was in bad shape, for the codling moth development would be heavy, in the later broods, after the dead line date set for late arsenical sprays. So the grower was urged to check codling moth with thorough and frequent earlier sprays and also to use moth bands on the trees. Apparently, nature helped the grower in his fight against the moth. One of the difficult things to do in general control of insects or diseases, is to keep the growing leaves and fruits covered with spray. This year the early moth development was delayed, and the leaves grew to full size before the moths were very active. So it was easier to keep the full-grown leaves covered with spray, and that's where the moth lost out. Codling moth injury was showing up lightly on the fruit that rolled across a lot of graders this season. In other words, codling moth seems to be on the run, and it looks like only good judgment to plan out next year's campaign to get as near 100% control of this pest as possible. Tree scraping, banding, and spraying are a big part of the battle.

INVESTIGATIONS ON THE VITAMIN CONENT OF APPLES

It is not the purpose of this paper to give a very complete report of research work on the vitamin content of apples. However, a few references to this subject may be of interest to the apple grower as well as to the consumer. Fellers, Isham and Smith of the Massachusetts Agricultural Experiment Station have reported that the Baldwin apple is a good source of vitamin C, while the McIntosh apple is a very poor source.[5] The McIntosh was from 1/6 to 1/10 as rich in vitamin C as the Baldwin. The skin of the Baldwin was found to be four times more active in vitamin C than the flesh near it, and six to ten times more active than the flesh near the core region. In the McIntosh the skin was likewise richer in vitamin C than the flesh. Tests were also made on cider and apple sauce. Fresh cider from Baldwin apples was a good source of vitamin C, but benzoated or pasteurized ciders were poor sources. Freshly made apple sauce retained only 20-30 per cent of the original vitamin content of the fresh apple. In another publication Fellers and Clague reported that Baldwin apples lost 20 per cent of their vitamin C content after four to six months in storage at 36° F.; after eight to ten months in storage, the loss was nearly 40 per cent.[6] Zilva, Kidd and West of England found vitamin C to vary in apple varieties and in one variety to deteriorate more at 50° than at 34° F.[7]

The vitamin C content of some western grown apples has been studied by Dr. Esther L. Batchelder of the Washington State College.[8] Winesap apples proved to be a good source of vitamin C. Approximately 10 grams of apple fed six days per week was sufficient to protect standard guinea pigs from scurvy for eight weeks or more. Other tests on Winesap showed that fruit from trees receiving a complete fertilizer was richer in vitamin C than fruit from trees receiving no fertilizer.

The vitamin A content of Starking and Golden Delicious, two yellow fleshed varieties, was compared with that of McIntosh, a white fleshed variety. It was considered that the white fleshed variety might prove to be a poorer source of vitamin A than the yellow fleshed varieties. However McIntosh was found to be slightly superior to Golden Delicious and distinctly superior to Starking in vitamin A content. The interesting subject of the vitamin content of apples and other fruits in receiving more and more attention and is being investigated in various research stations. Many questions remain to be answered. For example, what apple varieties are the richest sources of the vitamins? What storage temperature is best to preserve the vitamin contents of apples? How long in different varieties do the vitamin contents remain active, and what fruit characteristics of varieties, if any, are correlated with vitamin content? We will probably continue to learn more about the subject of vitamins in the near future.

[5] Feller, C. R., Isham, P. D. and Smith, G. G. Vitamin C distribution in Baldwin and McIntosh apples. Proce. Amer. Soc. Hort. Sci., 29:43-97. 1932.
[6] Feller, C. R. and Clague, J. A. Vitamin C studies in apples. Mass. Agr. Sci. Ind. Res. Fd. Invest. Bd. Rpt. 1931. pp. 128-129.
[7] Zila, S. S., Kidd, F. and West, C. Vitamin-content of apples. Dept. Exp. Sta., Bul. 293. p. 41. 1934.
[8] Batchelder, Esther L. The vitamin content of Washington grown fruits. Proc. Wash. State Hort. Assoc. 28:177-180. 1932.

STORAGE NOTES

Mr. E. J. Rasmussen of the University of New Hampshire, reporting before the New Hampshire Horticultural Society stated that storage experiments, using small storage rooms had shown differences in cooling, between cold storage where refrigerated pipes lined the walls and ceiling, and where blowers were used. Using 250 boxes of fruit stacked to form a square block, it was found that more than 250 hours (about 10½ days) were required to cool the center box of fruit from 60° to 32° F. in the coil pipe storage room, while a blower type cold storage cooled the fruit to the same temperature in 48 hours. There was as high as 20° difference between the cold storage air, and the temperature in the center of the stack of boxed fruit, where no circulation of cold air was provided.

FILLERS

Out in Michigan, the Experiment Station workers set some Oldenburg (Duchess) trees 20x20 feet and later thinned out part of them to 28x28 feet. Net returns (3 year average) from the 72 trees on the 20 x 20 foot plot showed the same net return as the 43 trees on the 28 x 28 foot plot. The 20 x 20 foot trees bore smaller, poorly-colored fruit, and grew poor shoots and leaves. The fruit was borne mostly in the tops of the 20 x 20 foot block, while the 28 x 28 foot trees bore fruits more evenly over the trees.

"John, you carry the baby and give me those eggs; you might drop them."

If you would know your friends, make a mistake.

Plan now to attend the

ANNUAL MEETINGS

of the Society

See the December Issue of

The Maryland Fruit Grower

For PEACHES and PEARS
USE SCALECIDE
In the Fall

Best control of the two major pests of peaches and pears —Peach Leaf Curl and Pear Psylla—is obtained by spraying in the Fall. Use Scalecide 1 to 15 at anytime the temperature is warmer than 40°. It is futile to spray for Psylla in the Spring after they have laid their eggs. Scalecide has a most remarkable record on pears. Many pear orchards owe their vigor, productiveness and longevity to the annual application of Scalecide. Write for new folder "How Scalecide Produces Amazing Response in the Pear Orchard".

For Peach Leaf Curl, best results are obtained by combining Sulfocide 1 to 150 or 200 with the Scalecide spray. The Scalecide carries the sulfur into places not often reached without this combination. Write for new folder "Peach Trees Need Scalecide".

USE PRATT'S TAR OILS

Straitar or Tar-o-wash

In the Fall for Rosy Aphis eggs

Fall application of Straitar and Tar-o-wash is recommended for Rosy Aphis eggs and other pests, because it is easier to do a 100% job in the absence of high winds, the ground is firmer and the great Spring rush is avoided. Straitar and Tar-o-wash have an enviable record of safety and effectiveness. They are the latest word in tar oil sprays. Write for folder "Uses and Features of Pratt's Oil Sprays".

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